

Partnership Matters

ISU Research and Extension

PARTNER
IOWA STATE UNIVERSITY
CORN AND SOYBEAN
INITIATIVE

March 2007

RESEARCH BRIEF —

Achieving higher corn yields

What's new. Increased demand for corn has generated much discussion about corn yields exceeding 300 bushels per acre. What should Iowa producers expect for actual yields and what management considerations should be examined to achieve high yields? As corn hybrids have developed, the focus has been toward increasing the stress tolerance of the individual corn plants. Corn yield potential per plant has not increased over the past 50 years, but the yield per acre has changed. Today's hybrid corn plants are able to withstand higher plant densities while still producing an ear. Having more plants per acre producing an ear results in higher yields.

It is critical that producers consider seeding rates when working to increase corn yields per acre. A significant portion of the observed yield increase per year is directly correlated with increased plant populations. During the previous 50 years, seeding rates have increased annually. Iowa plant populations have increased an average of approximately 425 plants per acre per year since 2001.

Although plant populations continue to increase, producers and agronomists must consider whether the yield advantage of planting more seed is economically profitable. Corn seed prices have increased an average of \$1.50 per acre since 2000.

ISU research. Seeding rates ranging from 25,000 to 45,000 seeds per acre were studied at 10 ISU-sponsored research locations in Iowa in 2006. The average optimum seeding rate across all locations was 35,000 seeds per acre. However, location played a huge role in the final yield results. The yield at four



Corn field at V3

of the 10 locations significantly dropped off when seeding rate exceeded between 30,000 and 35,000 seeds per acre; whereas, six of the 10 locations had highest yields from 35,000 to 45,000 seeds per acre. However, on a side note, there were 200-bushel yields in both of these groupings. Early-season vegetative growth and the conditions surrounding pollination no doubt were factors influencing which seeding rates were best for a site.

—continued

RESEARCH BRIEF —

Understanding the soybean aphid

What's new. Agriculturalists have learned a great deal about how to manage the soybean aphid since it was discovered in the Midwest eight years ago. A multi-state network of suction traps has revealed the dynamics of aphid migration that contribute to the cyclic nature of aphid outbreaks.

With relatively large numbers of soybean aphid collected during fall 2006, there is evidence that significant soybean aphid outbreaks could develop again in 2007. As populations of soybean aphids develop during the 2007 growing season, research supported by the Iowa Soybean Association from the soybean checkoff has helped entomologists to develop sampling plans and economic thresholds for foliar insecticides to prevent yield loss due to the feeding of the aphid. There are clearly many questions left unanswered regarding the biology of the soybean aphid, as witnessed by the great amount of variation in the timing and location of soybean aphid outbreaks. And growers still have many questions regarding what constitutes best management for this pest.



Winged soybean aphid

ISU research. The soybean entomology laboratory at Iowa State University, led by Matt O'Neal, entomologist, is focused on improving soybean aphid management for optimum yield protection. Currently, O'Neal's team is investigating the full spectrum of integrated pest management tools, ranging from seed treatments to the potential release of aphid parasitoids from Asia to host-plant resistance. In collaboration with Greg Tylka, extension plant pathologist and nematologist, and Felicitas Avendano, a postdoctoral research associate in plant pathology and entomology, the researchers are exploring interactions between soybean aphid and soybean cyst nematode (SCN). Potassium-deficient soybeans have been shown to support faster expansion of aphid populations. Soybean cyst nematodes compromise soybean uptake of nutrients, but it is not known if plants infected with SCN are more at risk for soybean aphid outbreaks. The primary research goal is to determine if thresholds should be adjusted when soybeans are at risk of nematode infection.

—continued

Achieving higher corn yields, *continued*—

Therefore, a seeding rate of 35,000 seeds per acre appears to be a good general recommendation based on 2006 data; however, it is imperative to consider both the field conditions and the environment when selecting which seeding rate to use.

What's next. Objectives for the 2007 growing season include the following:

- Continuing seeding rate research across Iowa;
- Characterizing environment and field conditions to determine why some sites respond more favorably to higher seeding rates than others; and
- Determining which seeding rates perform best within different row spacings, particularly 30" rows versus twin-row planting.

Learn more. For more information, visit the corn production website at www.agronext.iastate.edu/corn. Contact Roger Elmore (relmore@iastate.edu or 515-294-6655) or Lori Abendroth (labend@iastate.edu or 515-294-5692) with specific questions about corn seeding rates or corn production topics in general.

Understanding the soybean aphid, *continued*—

What's next. Objectives for the 2007 growing season include the following:

- Understanding the effects of row spacing on the speed and impact of soybean aphid outbreaks;
- Determining whether potential aphid-resistant soybean varieties perform effectively under field conditions; and
- Learning how soybeans respond when they are attacked by both soybean aphid and SCN, particularly in terms of soybean yield.

Learn more. For more information, go to the entomology site at www.soybeanaphid.info. For specific questions about the soybean aphid research project, contact Matt O'Neal at oneal@iastate.edu, or call Extension Entomology at (515) 294-1101.

ISU PROFILE —

John Kennicker

Extension field crops specialist, southwest and south-central Iowa since 2002



Origin

- Born in Dubuque, Iowa (Dubuque County)
- Raised on a farm just across the river from Dubuque in southwest Wisconsin

Training

- M.S., plant breeding and genetics, North Dakota State University, 1991
- B.S., soil and crop science, University of Wisconsin—Platteville, 1986
- Assistant plant breeder with Golden Harvest (corn research station)
- Research technician, HybriTech Seed International, Inc. (hybrid wheat station)
- Farming (large hog and beef operation), 1986–1988
- Crew foreman at a corn research station

At ISU

- Extension field crops specialist, central Iowa, 1999–2002
- Extension program specialist (north-central Iowa), 1996–1999

Notable achievements

- Certified professional agronomist and crop scientist
- Member, National Association of County Agricultural Agents
- Member, American Society of Agronomy
- Member, Sigma Xi honorary professional fraternity (agriculture)

Personal

- Enjoy hunting, fishing and traveling

Quotable quote

"I developed my interest in agronomy through my experiences on the family farm. Every day tends to bring new questions and the search for answers. Education does not start with school or end after school."

... and justice for all

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Many materials can be made available in alternative formats for ADA clients. To file a complaint of discrimination, write USDA, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Jack M. Payne, director, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa.

ISU BY THE NUMBERS —



Soybean rust odds and ends

First discovery of soybean rust in the continental United States.....	2004
Number of states with rust reported in 2006.....	15
Number of counties in the United States with rust reported in 2006.....	274
Number of days after soybean infection that transmissible spores can be produced	9
Documented kudzu plants growing in Iowa history	2 (1926–28, never flowered and died; 2003, never flowered and were removed)
Number of weeks a soybean rust lesion can produce spores.....	3
Minimum air temperature kudzu leaves (and soybean rust) can survive.....	~30 °F
Number of First Detectors trained in the Iowa Soybean Rust Fast Track Program.....	675

For more information and soybean rust updates, visit www.soybeanrust.info.

Partnership Matters is published electronically once a month for partners of the Corn and Soybean Initiative, with funding from the College of Agriculture and support from Iowa State University Extension. Brian Meyer, College of Agriculture, is executive editor of *Partnership Matters*; Keven Arrowsmith, Extension Communications and Marketing, is managing editor; and Donna Halloum, Information Technology Services, Iowa State University, is production designer.

To learn more about the Corn and Soybean Initiative contact

Greg Tylka gtylka@iastate.edu (515) 294-3021
Rich Pope ropope@iastate.edu (515) 294-5899

For questions or comments about the newsletter, contact

Keven Arrowsmith karrows@iastate.edu (515) 294-2405